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Appl. No.	:	09/885,319
Applicant	:	Stan et al.
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Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

AFFIDAVIT UNDER 37 CFR 1.131

I, Hong Q. Hou, declare that:

1. I am a resident of Albuquerque, New Mexico, and am an inventor in the above identified patent application (the "Patent Application").

2. I participated in the development of processes for the fabrication of solar cells, and prepared records describing such processes, prior to March 29, 1999.

3. The document attached hereto as Exhibit I is a portion of a print-out of an actual process control instruction sheet as stored in computer archival storage maintained by the

assignee of the Patent Application, Emcore Corporation of Somerset, New Jersey (hereinafter "Emcore"). The print-out was printed from the archival storage file on May 4, 2004, as indicated by the date on the top right hand portion of page 1.

4. Associated file records of Emcore (attached hereto as Exhibit II, with the actual dates being redacted) show that the date of creation the original document represented in Exhibit I, and correspondingly the actual E6523 process run itself, was made prior to March 29, 1999.

5. Exhibit I is a summary of the growth "recipe" of a test run of a triple-junction solar cell. The "recipe" is a sequence of instructions for controlling an Emcore E400 Reactor (hereinafter, the "Reactor") installed at Emcore's facilities in Somerset, New Jersey, used for metal organic chemical vapor deposition (MOCVD) growth of identified chemical elements or compounds on the surface of a substrate contained in the reactor chamber. Each line in the summary file represents a distinct layer of the solar cell or a process step performed as part of the fabrication process. The detailed recipe control from which this summary was generated was loaded into a control computer of the Reactor to control the on/off switches and amount of the gas flow (measured in ccm units) of each chemical from a bubbler through gas lines in the Reactor.

6. The identified "E6523 Process" identified in Exhibit I is one of a number of actual process runs conducted on a germanium substrate for research and development purposes relating to the deposition of surface layers for the creation of different solar cell

semiconductor structures that I personally conducted on the Reactor as a Project Manager in Somerset, New Jersey during 1999.

7. I participated in both the conception and specification of the materials systems and layers of the desired solar cell, and the actual implementation and performance of the E6523 process of Exhibit I on the Reactor. The E6523 process of Exhibit I resulted in the fabrication of a wafer including a solar cell having at least an InGaP layer formed directly on the surface of a germanium substrate, i.e. a layer containing both In and P.

8. Referring to page 1 of Exhibit I, the entry beginning with "TMAl" represents the process instructions for a first reactant, which is the E6523 Process actually corresponds to flow of trimethylindium. The use of the term "Al" in the "TMAl" was included in the software control instruction because the software identifying the register of the control line was designed and used in the past for a similar process involving aluminum, rather that indium. Since the use of indium as a constituent element was a new idea, the actual chemical compound in the bubbler connected to "Al" line was changed to trimethylindium, however, the computer software was not yet rewritten to designate "indium" or "In" instead of aluminum or "Al", along with its deposition conditions when the actual E6523 process was performed.

The process associated with the flow of trimethylindium at various timed intervals is represented by the sequence of columns to the right of the process instruction entries labeled Layer #1, Layer #2, etc., with various specified time durations.

9. The process instructions on page 1, line 4 beginning with "TMGa# 1-4", and continuing on to the first two entries on page 2, correspond to the flow of trimethylgallium, the metal organics for gallium.

10. On page 2, line 3, of Exhibit I, the process instructions labeled "ASH3#2_42" on page 2, line 3, corresponds to the flow of arsine.

11. On, page 2, line 4, the entry line labeled "PH3_43" identifies a process instruction to the Reactor associated with the flow of phosphine at various timed intervals represented by the columns (labeled on page 1) as Layer #1 (4.000 min), Layer #2 (6.000 min), etc. The letters "V" and "R" indicates that the flow is switched from a "vent" position to a "run" position, with the phosphine being introduced into the reactive chamber at the time intervals corresponding to the "R" notations.

12. The nucleation layer is designed to be n-type doped in InGaP on Ge. During the growth of the nucleation layer of InGaP, only TMIn and TMG were supplied for group-III growth; phosphine for group-V growth, and a doping quantity of silane was provided as dopant.

13. The ratio of gas flows between TMIn and TMGa were adjusted to make the lattice constant of InGaP match that of Ge substrate.

14. Although it is not designated in Exhibit I, a germanium substrate was selected and used in the E6523 process.

15. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under 18 U.S.C., section 1001.

07/21/04
Date

Hong Q. Hou